1. FOREST REPRODUCTIVE MATERIAL

The use of good quality forest reproductive material derived from a suitable and traceable provenance is the key to the establishment of healthy and productive forests.

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1.1 KEY FACTORS

EU regulations
Certificate of Provenance
Provenance suitability
Tracking system
Collection and marketing procedures

1.2 OBJECTIVES

To ensure tree seed sources are suitable for the site.
To maximise the use of indigenous material and material from a geographically similar location.
To ensure material is of good genetic quality.
To ensure procedures are properly implemented. To ensure tracking is transparent.
To ensure plant health regulations are being observed.

1.3 PROCEDURES

The quality of forest reproductive material is of high importance in ensuring viable, healthy and productive forests. The removal of trade barriers within the European Union applies to forest reproductive material as it does to other marketable products. However, due to the importance of geographical location and inherited characteristics of this material and their impact on forest quality, it is in the interest of EU Member States that rules imposing the highest possible standards are implemented. A substantial part of this section therefore refers to operations which take place under the auspices of the various EU Council Directives relating to forest reproductive material.

1.3.1 Forest reproductive material - basic material, origins and categories

Under existing and new EU Council Directives, forest reproductive material is described on the basis of a number of important terms.

1.3.1.1 Forest reproductive material

Forest reproductive material includes seeds, plants and other propagating material which are important for forestry purposes.

1.3.1.2 Region of Provenance

The Region of Provenance is an area or areas of sufficiently uniform ecological conditions, in which genetically similar stands or seed sources are found. Ireland is defined as one Region of Provenance.

1.3.1.3 Origin

Seed sources can be classified as follows:

i. An autochthonous stand or seed source is one which normally has been continuously regenerated by natural regeneration. The stand or seed source may be regenerated artificially from reproductive material collected in the same stand or seed source or autochthonous stands or seed sources within the close proximity.

ii. An indigenous stand or seed source is an autochthonous stand or seed source or is a stand or seed source raised artificially from seed, the origin of which is situated in the same Region of Provenance.

For an autochthonous stand or seed source, the origin is the place in which the trees are growing. For a non-autochthonous stand or seed source, the origin is the place from which the seed or plants were originally introduced. The origin of a stand or seed source may be unknown.
1.3.1.4 Basic material

Basic material includes the following:
Seed source: trees within an area from which seed is collected.
Stand: a delineated population of trees possessing sufficient uniformity in composition.
Seed orchard: a plantation of selected clones or families which is isolated or managed so as to avoid or reduce pollination from outside sources, and managed to produce frequent, abundant and easily harvested crops of seed.
Parents of family: trees used to obtain progeny by controlled or open pollination of one identified parent used as a female, with the pollen of one parent or a number of identified or unidentified parents.
Clone: group of individuals derived originally from a single individual by vegetative propagation, e.g. cuttings, micropropagation, grafts, etc.
Clonal mixture: a mixture of identified clones in defined proportions.

3.1.5 Categories of forest reproductive material

Source identified: reproductive material derived from basic material which may be either a seed source or stand located within a single Region of Provenance and which meets set requirements.
Selected: material derived from basic material which shall be a stand located within a single Region of Provenance, which has been phenotypically selected at the population level, and which meets set requirements.
Qualified: material derived from basic material which shall be seed orchards, parents of families, clones or clonal mixtures, the components of which have been phenotypically selected at the individual level, and which meets set requirements.
Tested: material derived from basic material which shall comprise stands, seed orchards, parents of families, clones or clonal mixtures. The superiority of the reproductive material must have been demonstrated by comparative testing or by an estimate of the superiority of the reproductive material calculated from the genetic evaluation of the components of the basic material. The material must also meet certain set requirements.

Table 1.1 gives the relationship between types of basic material and their categories, as outlined in the new Council Directive 1999/105/EC on the marketing of forest reproductive material.

<table>
<thead>
<tr>
<th>Categories</th>
<th>Source identified</th>
<th>Selected</th>
<th>Qualified</th>
<th>Tested</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seed source</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stand</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Seed orchard</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Parents of family</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clone</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Clonal mixture</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

1.3.2 EU regulations on forest reproductive material

Two Council Directives currently control the marketing and quality of reproductive material within the EU:
Directive 66/404/EEC on the marketing of forest reproductive material;
Directive 71/161/EEC on external quality standards for forest reproductive material marketed within the Community.

1.3.2.1 Purpose of the Directives

Directive 66/404/EEC regulates the reproductive material for sale of species commonly used for forestry purposes in the EU, and specifies approved basic material (e.g. from seed stands and seed orchards) and the delineation of Regions of Provenance. An amendment to the Directive takes into account selected and tested forest reproductive material with strict rules for tested material. The Directive allows for the exchange of information between Member States through the issuing of catalogues.

Directive 71/161/EEC deals with the external quality standards such as weight (for seeds), size and root collar dimensions of plants derived from listed reproductive material.

The new Directive 1999/105/EC proposes the following:
- To impose high standards for the trading of forest phenotypically or genetically superior reproductive material in the context of sustainable forest management and the need for conservation and biodiversity in European forests; rules to be applied for the use of species, and atypical hybrids for forestry purposes.
- To allow for the retention of special measures for reproductive material not for sale; to allow for exemptions in relation to exports and re-exports to third countries.
- Those plants or parts of plants conforming to the Directive standards to be subject to no other restrictions. However, Member States will be entitled to impose additional restrictions on material produced and traded within their territory.
- Lists of Regions of Provenance and National Registers of material to be drawn up for inclusion in a European publication and Master Certificate of Provenance details to accompany all material; reproductive material to be properly identified throughout the process; seeds to be properly sealed and labelled.
- Provisions for control by Member State, allowance for prohibition of unsuitable material and less stringent conditions to apply, if needed.
- Uniform rules and their application.
- Special standards for poplar.
- Protection in relation to genetically modified organisms (GMOs).

1.3.2.2 Scheduled

Table 1.2 lists the schedule of species under Council Directive 66/404/EEC.

<table>
<thead>
<tr>
<th>Botanical name (with synonym in parentheses)</th>
<th>Common name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pinus sylvestris</td>
<td>Scots pine Austrian or \n</td>
</tr>
</tbody>
</table>

In Ireland, under the various afforestation schemes, provenance information is required for ash (Fraxinus excelsior) and lodgepole pine (Pinus contorta), and is advisable other species.

The new Directive 1999/105/EC will add extensively to the above list of species (Table 3.1).
Table 1.3 Tree species and artificial hybrids, as listed in Annex I of Council Directive 1999/105/EC.

<table>
<thead>
<tr>
<th>Tree Species</th>
<th>Details</th>
</tr>
</thead>
</table>

1.3.2.3 National Catalogue,

The EU Directives currently require that a complete list of selected stands is included in National Catalogue and updated annually. Within the catalogue, the following is set out for each selected stand: catalogue number; location name; variety or number for clones; latitude, longitude and altitude; Region of Provenance (Ireland is one region).

Under the new Directive 1999/105/EC, each Member State will draw up a National Register of approved basic material with a summary in the form of a national list including the following details: botanical name; category; type of basic material; code for Region of Provenance; location according to category; altitude; area; origin.

2.4 Documentation necessary for the trading of forest reproductive material

Certificates of Provenance or referenced documents (suppliers document) to accompany reproductive material. A Master Certificate of Provenance according to category will be required under the new Directive 1999/105/EC. Approved labels for seed lots. The catalogues or registers of basic material to identify location will be held by the Forest Service.
1.3.2.5 Derogations

If there are shortages of forest reproductive material of scheduled species within the EU, applications can be made annually through the Forest Service to trade reproductive material under less stringent conditions, i.e. material purchased outside EU or within EU from unlisted categories of scheduled species. The derogation period is of limited duration.

1.3.3 OECD Scheme

Seed not scheduled under Directive 66/404/EEC may be traded under the OECD Scheme for the Control of Forest Reproductive Material moving in International Trade. This is a voluntary certification scheme aimed at providing the purchaser with basic material and category information. As well as EU Member States, USA, Canada, Switzerland and some Eastern European countries also participate.

Documentation, categories and types of material are similar to those in the EU framework. A participating country can include any forest species.

1.3.4 Seed collection procedures

Application to collect seed from a registered stand in Ireland under the EU or OECD framework must be made to the Forest Service. On approval, official Certificates of Provenance and labelling must accompany seed of scheduled species to the forest nursery/seed extractor. Documentation relating to the Certificate of Provenance and quantity of material should accompany reproductive material as far as the final purchaser, so that the origins of any planting stock can be traced. Sown lots must be identified in the nursery.

1.3.5 Import procedure

Official Certificates of Provenance should accompany reproductive material imported under both the EU and OECD frameworks.

1.3.6 Plant health regulations

The movement of forest reproductive material (plants) is also subject to EU Council Directive 77/93/EEC on protective measures against the introduction into the Community of organisms harmful to plants or plant products and against their spread within the Community. There are particular restrictions for Ireland, due to its relatively pest-free status as an island.

Plants of the following genera should only be purchased from registered nurseries and plants must be accompanied by a valid EU Plant Passport: Abies, Larix, Picea, Pinus, Pseudotsuga, Prunus and Sorbus (see SECTION 8: FOREST PESTS AND DISEASES). If any unusual pest or disease is observed on plant material, contact the local Forestry Inspector.

1.3.7 Managing seed stands and seed orchards

Seed stand management is aimed at ensuring the continued improvement in quality and vigour of the parent material. Thinnings are based on the retention of the best individuals in order to improve crop characteristics into the next generation. For commonly planted species, the most cost-effective collection method is from felled trees during thinning (which will however increase variability, as these may not be the best individuals) or at clearfelling, on the basis that this takes place during a seed year. For less common or long rotation species and broadleaves in general, other methods may be necessary, including climbing and ground collection. Tree climbing is a dangerous operation, and full adherence to safety measures is essential.

The Forest Service must be notified in advance of the intention to clearfell seed stands.

1.4 ENVIRONMENTAL ASPECTS

A perceived environmental threat is that introduced material will replace or displace native species. In Ireland, modern forestry has developed from introduced species, due to the limited number of native species in general, and the lack of native conifer species with...
commercial potential. As modern Irish forestry emerged from a situation where only one percent of the countryside was wooded, very few native woodlands have been displaced by introduced species in recent times. The increased planting of broadleaves, the conservation of surviving native and semi-natural woodlands, and the development of riparian and amenity areas will encourage the spread of native species. New seed processing facilities will allow increased collection and storage of native material.

The inclusion of the category ‘source identified’ in the new Council Directive 1999/105/EC, which comes into force from 1 January, 2003, should encourage the maintenance of native stands and individuals as seed sources, thereby reducing the dependence on imports. There is always the possibility of the dilution of the native gene pool through imported stock, but this is as yet unquantified and the impact of past imports is unknown. The new Directive takes into account the declaration stated at the Ministerial Conference on the Protection of Forests in Europe in Lisbon, 1998, that the origins of native species and local provenances which are well adapted to site conditions are to be preferred, and that genetically modified forest reproductive material which is unsafe for health or the environment should not be placed on the market.

Environmental risks in relation to introduced pests and diseases are inherent in the trading of plants and timber between countries. Stringent controls are necessary to reduce these risks.

Poor quality genetic material or undesirable vegetatively reproduced or genetically modified plants pose a risk to wild populations of native or introduced species. Strong genetic controls are also required in the large-scale introduction of imported seeds or plants.

1.5 ADVERSE IMPACTS

- Breach of relevant EU Council Directives
- Wrong seed sources used
- Poor quality material
- Source untraceable
- Incorrect or inadequate information on necessary documentation
- Genuine documentation but not corresponding to stock
- Failure to avail of indigenous sources
- Risk of imported pests and diseases

1.6 BEST PRACTICE

- Good quality, well-managed seed sources
- Proper seed collection procedures
- Appropriate packaging
- Check documentation and labelling at each transaction
- Confirm source with supplier
- Ensure sources are listed
- Increase home collection sources
- Proper processing and storage facilities
- Comply with plant health regulations

1.7 REFERENCE MATERIAL